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Article

The Relationship Between Multilingualism and Personality: A Replication of Dewaele and Botes (2020) with Bayes Factors

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Abstract

Dewaele and Botes (2020) conducted a quantitative research study on the relationship between multilingualism and five personality traits (cultural empathy, flexibility, social initiative, open-mindedness, and emotional stability) with 651 multilingual participants all over the world. In their research study, a statistically weak positive correlation between the number of languages spoken and three personality variables (flexibility, social initiative, and open-mindedness) was detected. However, in order to validate the generalisability of their findings, replication studies with monolingual participants still are vital. As a result, the researchers conducted a replication study with 401 people and revealed a noticeable inconsistency with Dewale and Botes' (2020) original study. From this finding, more replication studies by Dewale and Botes (2020) are crucial for exploring the association between multilingualism and personalities.

Keywords

multilingualism, personality traits, replication, Bayes factors

Multilingualism, defined as "the use of more than one language or competence in more than one language" (Clyne, 1997, p. 301), can be a determining factor in shaping one's personality (Wei & Hu, 2018). However, little research on the exploration of the relationship between multilingualism and personality traits had been conducted until recently, when researchers in applied linguistics began to connect positive psychology to language acquisition (Dewaele et al., 2019). For this research interest, Dewaele and Botes (2020) aimed to explore the relationship between multilingualism and personality traits with 651 multilingual people through online questionnaires. In their research study, a positive correlation between the number of languages spoken and the three personality variables was detected. However, several limitations, including the necessity of monolingualism participants, need to be addressed. As some replication research studies addressing these issues need to be conducted in order to judge whether their findings can be generalisable, the researchers adopted a questionnaire utilised in Dewaele and Botes (2020)'s study and conducted a replication study with a total of 401 participants.

Literature Review

Dewaele and Botes (2020)'s Study

Dewaele and Botes (2020) conducted an exploratory research study on the relationship between the number of languages spoken, which was considered multilingualism, and the personalities of 651 multilingual people all over the world through an online questionnaire. Their questionnaire items aimed to explore five personality factors: cultural empathy, flexibility, social initiative, open-mindedness, and emotional stability. Based on Pearson's correlation coefficients, Dewaele and Botes (2020) found a weak positive association between the number of languages spoken and three personality variables (flexibility, social initiative, and open-mindedness) was detected: flexibility ($r = 0.134$; $p < 0.01$), social initiative ($r = 0.158$, $p < 0.01$), and open-mindedness ($r = 0.203$,

$p < 0.01$). As one of the limitations, the scholars suggested that future research should include monolingual participants. Therefore, the present research study seeks to address this research issue.

Research Question

As the present study is a replication study, the following research question (RQ) is based on Dewaele and Botes (2020).

RQ: To what extent is there a possible relationship between multilingualism – as measured by the number of languages known – and the scores of individuals on the five factors of the Multicultural Personality Questionnaire?

Method

Participants

In this study, 450 people from all over the world, including Japan, the US, and China, participated by taking an online survey adopted from Dewaele and Botes (2020)'s study. However, 29 of them did not indicate their consent to participate in this replication study. Furthermore, 20 people did not answer all personality questionnaire items. Therefore, 49 people were excluded, and thus 401 people were considered participants in this research study. Among 401 participants, 235 of them took the online survey in English, and the other 166 did in Japanese. Their age ranged from 20 to 40 years old. Based on the data collected from this survey questionnaire taken by a noticeably extensive age group, the researcher explored the relationship between the number of languages they spoke and their personalities.

Instruments and Procedures

The researchers decided to utilise the Multicultural Personality Questionnaire (MPQ) invented by van der Zee et al. (2013) in English because it was so utilised in Dewaele and Botes (2020)'s original study. In order to collect data from Japanese participants, the researchers of the present investigation translated the MPQ into Japanese, and one native speaker of English conducted back-

translation in order to recheck the consistent meaning. Before using both the English and Japanese versions for this study, a pilot study was conducted with ten people, who did not participate in this investigation. The item reliability of each personality variable (cultural empathy, flexibility, social initiative, open-mindedness, and emotional stability) was estimated using both Cronbach's alpha (α) and McDonald's omega (ω) through JASP (2022) because the use of these reliability scales has been debated (e.g., McKay & Plonsky, 2021; McNeish, 2018; Raykov & Marcoulides, 2019). In addition, the researchers referred to feedback from the participants of the pilot study, and they revised the MPQ and Japanese translations. The questionnaire was uploaded on Google Forms, and the link was distributed through a snowballing sampling strategy. That is, the researchers sent emails with the link and the information for future participants to their friends and colleagues and asked them to forward the email to others. Through this procedure, this replication research study was conducted.

Online Survey.

An online survey was employed through Google Forms under the condition of anonymity. The questionnaire had two main sections. The first section collected the participants' background information, including their nationality, age, current country of residence, their first language, additional languages they can speak, their language proficiency levels, and how they acquired the additional languages. The second section then delved into their multicultural personality, adopted from van der Zee et al. (2013)'s MPQ. The MPQ consists of 40 questions exploring five personality types: cultural empathy, flexibility, social initiative, open-mindedness, and emotional stability. All the questions were translated into Japanese for the participants who preferred answering questions in Japanese, especially participants who identified as Japanese nationals. Table 1 indicates scale reliability in each personal dimension and the 95% confidence interval (CI). The estimates from Dewaele and Botes (2020)'s original study are also listed for comparison.

Table 1 *Scale Reliabilities of Five Personality Dimensions*

	This Replication Study				Dewaele and Botes (2020)
	Scale Reliabilities		95% CI		Scale Reliabilities
Personality Dimensions	**α**	**ω**	**Lower**	**Upper**	**α**
Cultural Empathy	0.76	0.77	0.73	0.80	0.81
Flexibility	0.84	0.84	0.81	0.86	0.82
Social Initiative	0.77	0.47	0.73	0.80	0.80
Open Mindedness	0.74	0.75	0.71	0.78	0.77
Emotional Stability	0.82	0.63	0.79	0.85	0.77

Note: CI = Confidence Interval, α = Cronbach's α, ω = McDonald's ω.

Table 2 *The Benchmark for Internal Consistency*

>0.90	very high reliable
0.80–0.90	highly reliable
0.70–0.79	Reliable
0.60–0.69	marginally/minimally reliable
<0.60	unacceptably low reliability

(cited from Cohen et al., 2018, p. 774)

Benchmarks for instrument reliability scores vary among researchers and academic fields. For example, in the field of applied linguistics, internal consistency scores between 0.7 and 0.8 can be interpreted as normal (Plonsky & Derrick, 2016). On the other hand, in the educational research field, Cohen et al (2018) suggest that researchers can refer to the criteria to judge the reliability (Table 2).

Based on both Cohen et al (2018)'s benchmark and Plonsky and Derrick (2016)'s benchmark, McDonald's omega scores for social initiative and emotional stability were almost 0.6 or lower. However, all the personality dimensions had a fairly high reliability of Cronbach's alpha for exploring the target traits. Therefore, the survey results in the pilot study were considered sufficiently reliable enough to address the research question and examine the relationship

between personality dimensions and multilingualism.

Data Analysis

The quantitative data collected from the online MPQ were analysed through descriptive and inferential statistics with JASP (2022). Before performing descriptive statistics, the participants' additional languages and their language proficiency levels were observed. Similar to Dewaele and Botes (2020)'s original study, where participants reported that their proficiency levels for one or more languages were below the intermediate level, the researchers did not include these additional languages in the number of spoken languages. Descriptive statistics were utilised in order to examine the distribution, skewness, and kurtosis. In addition, Shapiro-Wilk tests were also conducted to judge whether the distribution could be considered normal. The analysed data were reported through boxplots with violin and jitter elements (Appendix). Following that, the Bayesian Kendall rank correlation coefficient testing (BKRCCT) was employed in this research study due to the descriptive statistical results (Appendix). For the interpretation of the correlation coefficient, Evans (1996)'s benchmark was utilised (Table 3).

Furthermore, although Dewaele and Botes (2020)'s original study was analysed with only the null hypothesis relying on the p-value, the issues of using this hypothesis are currently discussed (e.g., Wasserstein & Lazar, 2016). Therefore, the Bayesian approach, considered an effective alternative approach to estimating the statistical probability (Norouzian et al., 2018, 2019), was utilised in order to address the problems and detect different statistical probabilities and findings. The benchmark used to judge the degree of the Bayesian factor (BF) was based on Norouzian et al. (2019) (Table 4). With the benchmarks and statistical testing, quantitative data were analysed to explore the correlation between the number of languages and personality traits.

Table 3 *Evans (1996)'s Correlation Coefficient Benchmark*

Correlation Coefficient	Strengths
0–0.19	very weak
0.20–0.39	weak
0.40–0.59	moderate
0.60–0.79	strong
0.8–1.0	very strong

Table 4 *Bayes Factor Clarification Scale*

Bayes Factor $\left(\frac{Alternative}{Null}\right)$	Strengths of Evidence
> 100	Decisive evidence for *Alternative*
10–30	Very strong evidence for *Alternative*
3–10	Substantial evidence for *Alternative*
1–3	Anecdotal evidence for *Alternative*
1	Hypothesis Insensitive evidence (No Evidence for either hypothesis)
1/3 – 1	Anecdotal evidence for *Null*
1/10 – 1/3	Substantial evidence for *Null*
1/30 – 1/10	Strong evidence for *Null*
1/100 – 1/30	Very strong evidence for *Null*
< 1/100	Decisive evidence for *Null*

(adopted from Norouzian et al, 2019, p. 252, italics in original)

Results

Descriptive Statistic Results

The scope of this replication study was to include monolingual speakers in the data set to address the limitation reported in Dewaele and Botes (2020)'s original research. As a result, the researchers deemed it important to introduce the number of monolingual and multilingual participants who contributed to this study. Table 5 below reports on the number of languages the participants speak.

In addition, the descriptive statistical results and the Shapiro-Wilk test results did not detect a normal distribution (skewness = 1.07, kurtosis = 2.06, Shapiro-Wilk = 0.841, and $p < 0.001$). Thus, non-parametric inferential tests are considered to be more appropriate than parametric inferential tests.

Similarly, descriptive statistical results indicated that the distributions in all the personality dimensions were not normal (Appendix) because they were noticeably skewed especially for cultural empathy, and open-mindedness (Table 6). Furthermore, the boxplots also indicate that each had one or two outliers in this study. Therefore, as these statistical results indicate that it was not suitable to employ the parametric inferential statistic testing in order to examine the correlation between multilingualism and each personal dimension variable, the

Table 5 *The Number of Languages the Participants Speak*

	The Number of Languages the Participants Speak							Total
	1	2	3	4	5	6	7	
Speakers	110	181	79	24	5	1	1	401

Note: Data Collected in March 2020.

Table 6 *Descriptive Statistics of the Personality Dimensions*

	Personality Dimensions				
	Cultural Empathy	Flexibility	Social Initiative	Open Mindedness	Emotional Stability
Mean	32.72	26.85	26.84	30.36	24.11
SD	4.36	6.03	3.49	4.81	4.58
Skewness	–0.92	–0.15	–0.27	–0.64	–0.11
Kurtosis	2.31	–0.16	2.26	1.16	–0.15
Shapiro-Wilk	0.95	0.99	0.97	0.97	0.99
p-value for Shapiro-Wilk	< 0.001	0.057	< 0.001	< 0.001	0.012
Minimum	8	8	8	8	8
Maximum	40	40	39	40	36

Notes: Data Collected in March 2020. Number = 401, SD = standard deviation

nonparametric inferential statistic testing was appropriate for use in this setting.

The Correlation Coefficient between Multilingualism and Each Personal Dimension

The correlation between multilingualism and each personal dimension was analysed with BKRCCT (Table 7). Regarding the correlation between mul-

Table 7 *Bayesian Kendall's Tau for the Correlation Between the Number of Languages and Personality Traits*

Personality Traits	Statistics	The Number of Languages
Cultural Empathy	Kendall's tau	0.047
	p	0.228
	BF_{10}	0.178
	Upper 95% CI	0.110
	Lower 95% CI	–0.020
Flexibility	Kendall's tau	0.117
	p	0.003
	BF_{10}	27.874
	Upper 95% CI	0.180
	Lower 95% CI	0.050
Social Initiative	Kendall's tau	0.019
	p	0.634
	BF_{10}	0.077
	Upper 95% CI	0.082
	Lower 95% CI	–0.048
Open Mindedness	Kendall's tau	0.046
	p	0.240
	BF_{10}	0.168
	Upper 95% CI	0.110
	Lower 95% CI	–0.020
Emotional Stability	Kendall's tau	–0.021
	p	0.594
	BF_{10}	0.079
	Upper 95% CI	0.044
	Lower 95% CI	–0.086

Note: Data Collected in March 2020.

tilingualism and cultural empathy, the BKRCCT result revealed a low Bayes factor and small correlation coefficient (Kendall's tau = 0.047, p = 0. 228, BF_{10} = 0.178). Therefore, the statistical result indicates no correlation between the number of languages and cultural empathy.

The BKRCCT result indicated a very weak correlation between the number of languages and flexibility because the p-value showed the statistical significance and the Bayesian factor detected could be perceived as very strong evidence for alternative (Kendall's tau = 0.117, p = 0.003, BF_{10} = 27.874). By examining CIs, small correlation coefficients were further detected.

No correlation was detected between the number of languages and social initiative or a statistically significant probability (Kendall's tau = 0.019, p = 0.634, BF_{10} = 0.077). Similarly, no correlation between the number of languages and open-mindedness, and between the number of languages and emotional stability was detected due to noticeably small Bayesian factors and high p-values. Therefore, the statistical testing results indicated no correlation between the number of languages and each personality trait of social initiative, open mindedness, and emotional stability.

To sum up, the BKRCT test results indicated that none of the five personality traits, except for flexibility, had a correlation coefficient between the number of languages the participants spoke because none of them, apart from flexibility, had high Bayesian factors or small p-values. Accordingly, the survey results revealed no correlation between the number of languages and almost all the personality traits in this present study.

Discussion

The research question based on Dewaele and Botes (2020) sought to examine to what extent there is a possible relationship between multilingualism and the five personality factors of cultural empathy, flexibility, social initiative, open-mindedness, and emotional stability. The findings of this research study indicated

that, statistically, there was no correlation between the number of languages the participants spoke and almost all the personality dimensions. Neither small p-values nor high Bayesian factors were detected among all the personality traits, excluding flexibility. Although some of the results were consistent with Dewale and Botes (2020)'s research findings on the relationships between the number of spoken languages and some personality dimensions (cultural empathy, flexibility, and emotional stability), the others are noticeably inconsistent with their findings on the correlation between the number of languages spoken and two personality dimensions (social initiative, and open-mindedness). However, the results might support Maher (2017)'s statement that multilingualism differs from multiculturalism. Therefore, this replication research study did not fully support Dewale and Botes (2020)'s conclusion.

Noticeable limitations of this research report include comparisons between survey results among the participants' nationalities. Assuming from the research finding, no clear relationship between the number of languages and personality traits might be detected. Since replication studies have rarely been conducted in applied linguistics (Porte & McManus, 2019), the present replication study might contribute to advancing the knowledge of the academic field. Furthermore, utilising Bayes factors in addition to the p-value might also have addressed the issues of the null hypothesis and raised the reliability of the findings in this study. However, cultural and social beliefs, such as individualism (a social belief that stresses the importance of being independent and autonomous) and collectivism (a social belief that stresses the importance of collaboration and group-thinking), might influence the personality dimension results, and statistically significant differences might be uncovered. Moreover, there were noticeable outliers due to their age distributions. They might have had some influence on the survey results, and this indicates that the samples in this investigation do not represent the entire population. Therefore, further research would require more people and different age groups. This might also enable researchers to explore possible

factors in their personalities and interest in language learning.

Conclusion

The aim of this replication study was to reveal the reliability of the findings reported by Dewaele and Botes (2020) in terms of the relationship between the number of languages spoken and personality dimensions. The research findings in the present study revealed that there was no correlation between the number of languages spoken and any personality traits, except flexibility. In this specific setting, it is reasonable to conclude that multilingualism does not form personality traits. As the noticeable inconsistency of the original research findings was also detected in this research study, the necessity of replications of Dewaele and Botes (2020) in various settings seems to be more emphasised in order to validate their findings.

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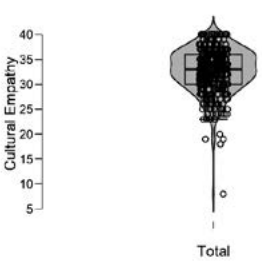
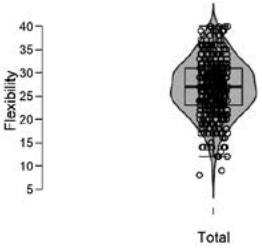
Appendix

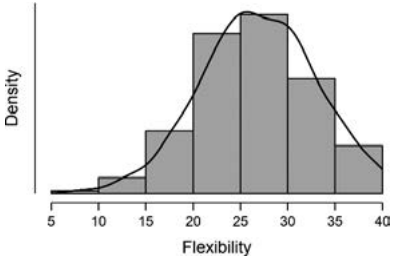
Boxplots and Histograms for Descriptive Statistic Results of Multicultural Personality Traits

Cultural Empathy

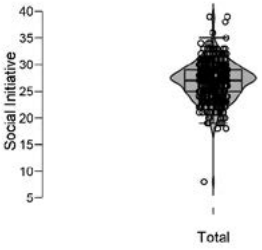


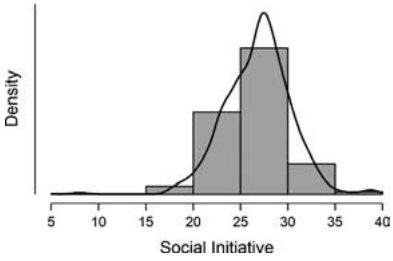
Flexibility



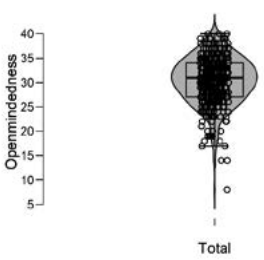


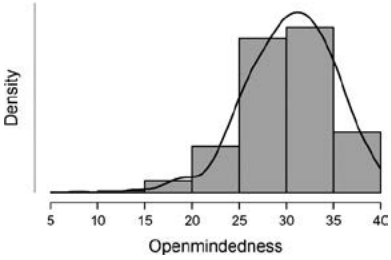
Social Initiative





Open-Mindedness





Emotional Stability